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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/650,002

08/27/2003

Varughese Mathew

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11/02/2004

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EXAMINER

EVERHART, CARIDAD

ART UNIT

PAPER NUMBER

2825

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/650,002

Applicant(s)

MATHEW ET AL.

Examiner

Caridad M. Everhart

Art Unit

2825

ME

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2-2-2004, 8/27/2003
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1,-4,6-9, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kong, et al (US 6,797,312B2).

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Kong, et al disclose a plating solution(col. 3, lines 40-43) which includes a cobalt compound(col. 3,lines 65-67), a first chelating agent(a citric acid complexing agent, col. 6, lines 30-40), first and second pH adjusters or buffers(col. 6, lines 5-10 and col. 6, lines 43-53), a surfactant (col. 6,lines 55-61), and a barrier metal (col. 3, lines 65-67), and a boron-containing compound(col. 5, lines 30-35), and the solution is heated (col. 7, lines 28-35), and the substrate is immersed in the solution in a bath(col. 1, lines 35-44) and then removed from the solution(col. 7,lines 33-35). Kong also teaches malic acid and glycine as the complexing agent(col. 6, lines 30-40). Kong teaches copper as the exposed metal(col. 5, lines 4-6).

Kong et al is silent with respect to a second chelating agent.

Although Kong et al is silent with respect to a second chelating agent, it would have been obvious to one of ordinary skill in the art at the time of the invention that the presence of a second chelating agent is encompassed by the teaching of Kong et al because Kong et al teaches ammonium salts, and that ammonium salts also have a chelating function(col. 6, lines 45-55), and that therefore more than one chelating agent can be used.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3,7, 8, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Brusic et al (US 5,755,859).

Brusic, et al discloses a solution which includes two chelating agents, cobalt sulfate, a surfactant, a boron compound, a barrier compound, a citrate buffer, and a second buffer(col. 4, lines 5-10 and lines 35-43). The bath is heated (col. 4,lines 46-48). The layer is applied to copper conductor which has been cleaned(col. 5,lines 38-41).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brusic et al as applied to claim 1.

Brusic et al is silent with respect to the copper pads being planarized, although Brusic et al discloses that the copper pads are made by conventional means(col. 6, lines 1-2).

Lee discloses that copper pads are prepared by planaization(col. 6, lines 50-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the teaching of Lee with the method taught by Brusic et al in order to obtain the benefit of a planar layer for further layers to be planar, and because Brusic et al teach that the pads may be made by methods known in the art.

Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kong et al as applied to claim1 above, and further in view of Chebiam et al (US 6,645,567B2).

Kong et al does not teach TMAH, although Kong et al teaches that TMAH is known in the prior art(col. 2, lines 10-17).

Chebiam et al teaches that TMAH may be used in cobalt plating baths as a buffering agent(col. 5, lines 1-9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used TMAH in the process taught by Kong et al because Chebiam et al teach that is a usefull complexing and buffereing agent(col. 4,lines 38-45) and because Kong et al recognize that this a useful compound for a cobalt plating solution(col. 2, lines 10-17).

With respect to other limitations of the claims such as amount of the compounds added to the solution, it would have been obvious to one of ordinary skill in the art at the time of the invention to have determined the amount of the compounds to add to the solution in order to obtain the plating of the substrate, because the amount of the compound is a variable of the art which one of ordinary skill in the art could determine. With respect to the recited surfactants, it would have been obvious to one of ordinary skill in the art at the time of the invention to have chosen these compounds because they are well known surfactants. The surfactants would have different stabilization parameters, because two different surfactants were chosen.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Everhart
10-30-2004

C. Everhart
CONFIDENTIAL
PRIMARY/EXAMINER